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Rapid and simple method for purification of nucleic acids.

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We have developed a simple, rapid, and reliable protocol for the small-scale purification of DNA and RNA from, e.g., human serum and urine. The method is based on the lysing and nuclease-inactivating properties of the chaotropic agent guanidinium thiocyanate together with the nucleic acid-binding properties of silica particles or diatoms in the presence of this agent. By using size-fractionated silica particles, nucleic acids (covalently closed circular, relaxed circular, and linear double-stranded DNA; single-stranded DNA; and rRNA) could be purified from 1 different specimens in less than 1 h and were recovered in the initial reaction vesse Purified DNA (although significantly sheared) was a good substrate for restriction endonucleases and DNA ligase and was recovered with high yields (usually over 50%) from the picogram to the microgram level. Copurified rRNA was recovered almost undegraded. Substituting size-fractionated silica particles for diatoms (the fossilized cell walls of unicellular algae) allowed for the purification of microgram amounts of genomic DNA, plasmid DNA, and rRNA from cell-rich sources, as exemplified for pathogenic gram-negative bacteria. In this paper, we show representative experiments illustrating some characteristics of the procedure which may have wide application in clinical microbiology.

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